

Brookhaven National Laboratory/National Synchrotron Light Source				
Subject:	LINAC MODULATOR PFN TUNING and TROUBLESHOOTING			
Number:	LS-SDL-0035	Revision:	A	Effective: 2/19/04
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*Approval signatures on file with master copy.

Introduction

The DUVFEL Linac Modulator PFN is essentially a bank of capacitors, the total capacitance is about half a microfarad charged up to a maximum 50 thousand volts. Along with the capacitors are variable inductors, which are tuned to match the load and to provide a flat RF pulse. This tuning must be done with High Voltage at its operating level with RF drive on the Klystron. The cavity input power is displayed on an oscilloscope, as is the PFN output voltage, the inductors are then tuned for a proper match and RF pulse flatness. There is essentially no practical way to tune the PFN unless it's running in an operational mode that's with the **High Voltage and RF power on**.

Note 1: This is not a working hot permit or procedure. This procedure has been developed to preclude a working hot situation. LO/TO will be enforced when entering the PFN High Voltage cabinet.

Note 2: The two-man rule shall be used for this procedure. Both must be authorized with at least one qualified to the responsible level for this equipment.

Note 3: All personnel within the barricaded area shall wear Safety glasses when High Voltage is on and the mesh door (or another approved tuning barrier) is in place.

Note 4: The modulator shall never be left unattended with mesh door in place unless High Voltage is locked and tagged.

Procedures

1. Establish a barricade to keep unauthorized personnel at a safe distance from the modulator being tuned.
2. Secure modulator [LO/TO] according to "Modulator High Voltage Lockout / Tagout procedure" that should be located on the PFN cabinet.
3. The PFN front panel can now be removed and replaced with mesh door (or other approved tuning barrier).
4. The High Voltage probe may be connected at this time.
5. Lock and tag may now be removed and High Voltage turned on. **See Note 3 & 4**
6. PFN may now be tuned by inserting insulated end of grounding stick (or other approved tool) through the wire mesh door to adjust inductors.
7. Entry to the PFN to adjust wire lead on inductor must be preceded by LO/TO.
8. After tuning is completed, de-energize and secure High Voltage source following LO/TO procedure.

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9. Remove the mesh door (or other approved tuning barrier) and reinstall front panel, remove barricade and remove lock and tag. Modulator may now be turned on.

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